CLAIMS

What is claimed is:

1. A system for secure data communication, the system comprising:

a. a processor that provides a first virtual address, a second virtual address, and a process identifier;

b. a first memory circuit coupled to the processor, the first virtual address corresponding to a first physical address of the first memory;

c. a memory management circuit coupled to the processor, the memory management circuit comprising a second memory circuit in operation containing indicia of:

(1) a first association of the first virtual address, the first physical address, and the process identifier; and

(2) a second association of the second virtual address, the second physical address, and the process identifier; wherein

(3) the memory management circuit provides the first physical address in response to receiving the first physical address and the process identifier, and provides the second physical address in response to receiving the second physical address and the process identifier; and

d. a network interface comprising:

(1) a third memory circuit in operation containing indicia of:

(a) a third association of the first virtual address and the first physical address; and

(b) a fourth association of the second physical address and the first physical address;

(2) a command interface circuit that provides a signal in response to receiving the second physical address and the first virtual address; and

(3) a bridge for coupling the system to a computer network for data communication, the bridge circuit comprising an interface circuit that couples the system to a provided network for data communication, the bridge circuit operative, in response to the signal:

(a) to obtain the first physical address from the third memory circuit as addressed in accordance with the first virtual address; and

(b) to transfer data between the interface circuit and the first memory circuit as addressed by the first physical address for data communication.

2. A method for data communication, the method performed by a first computer for communication with a second computer, the method comprising:

creating a password;

establishing a data communication channel with the second computer, the channel being identified by a channel identifier;

associating the password with the channel identifier;

creating a first map that associates a plurality of virtual I/O addresses with a plurality of physical I/O addresses;

associating the first map with a process, the process identified by a process identifier;

requiring the process identifier for accessing the first map;

creating a second map that associates a plurality of virtual memory addresses with a plurality of physical memory addresses;

determining a memory handle in accordance with a virtual address of the second map;

associating the password and the memory handle with the second map;

requiring the password for accessing the second map; and

communicating via the channel data identified in accordance with the memory handle.

3. A method for transmitting data onto a network, the method comprising:

providing a memory handle corresponding to a registered virtual memory address, data at the virtual memory address for transmission onto the network;

issuing a command with reference to a registered virtual I/O address;

determining, in response to the command, a physical memory address in accordance with the memory handle; and

transmitting data that was read in accordance with the physical memory address.

4. A method for data communication, the method comprising:

performing, by a central processor, an I/O write instruction for effecting data communication by a network controller, the I/O write instruction associated with a process identifier, the instruction comprising a registered doorbell virtual page number, an operation identifier, and a registered virtual memory address, each registered address being associated with the process identifier;

permitting conversion of the doorbell virtual page number to a doorbell physical page number in accordance with the process identifier;

associating the registered virtual memory address, the doorbell physical page number, and a password;

permitting conversion of the registered virtual memory address to a physical memory address in accordance with the password; and

performing data communication as effected by the I/O write instruction in accordance with data read in accordance with the physical memory address.

5. A method for data communication, the method performed by a network interface of a first computer, the first computer comprising a first memory, the network interface comprising a second memory, the method comprising:

receiving a channel identifier;

obtaining from a first data structure of the second memory a first password and a physical address of a description of a block to send, the first data structure accessible in accordance with the channel identifier;

obtaining from a second data structure of the first memory a memory handle and a first virtual address referring to the first memory, the second data structure accessible in accordance with the physical address of the description of the block to send;

determining an index value in accordance with the memory handle and the first virtual address;

obtaining from a third data structure of the second memory a second password and a first physical address corresponding to the first virtual address, the third data structure accessible in accordance with the index value;

abandoning data communication if the first password does not compare successfully with the second password; and

engaging in data communication with reference to the first physical address.

6. A data structure maintained in a network interface, the network interface for installation in a host computer, the data structure comprising:

a. a plurality of entries, each entry comprising:

(1) a physical address of a page of memory of the host computer;

(2) a password; and

(3) a validity flag; wherein

b. entries in the data structure are addressable by an index value, the index value being determined in accordance with a sum of a memory handle and a virtual address of a page of memory of the host computer, the virtual address corresponding to the physical address.

7. A data structure maintained in a network interface, the network interface for installation in a host computer, the network interface for data communication via a plurality of channels, the data structure comprising:

a. a plurality of entries, each entry comprising:

(1) a first physical I/O address of the host computer, the first physical I/O address for addressing the network interface;

(2) a password; and

(3) a second physical memory address of the host computer, the second physical for identifying data for communication by the network interface; wherein

b. entries in the data structure are addressable by a channel identifier, the channel identifier for identifying a particular channel of the plurality of channels for data communication.